

COVARIANCES FOR NEUTRON CROSS SECTIONS  
CALCULATED USING A REGIONAL MODEL BASED  
ON LOCAL-MODEL FITS TO EXPERIMENTAL DATA\*

by

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ABSTRACT

We suggest a procedure for estimating uncertainties in neutron cross sections calculated with a nuclear model descriptive of a specific mass region. It applies standard error propagation techniques, using a model-parameter covariance matrix. Generally, available codes do not generate covariance information in conjunction with their fitting algorithms. Therefore, we resort to estimating a relative covariance matrix a posteriori from a statistical examination of the scatter of elemental parameter values about the regional representation. We numerically demonstrate our method by considering an optical-statistical model analysis of a body of total and elastic scattering data for the light fission-fragment mass region. In this example, strong uncertainty correlations emerge and they conspire to reduce estimated errors to some 50% of those obtained from a naive uncorrelated summation in quadrature.

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